# The Evolutionary Seesaw: Origins of Biodiversity?

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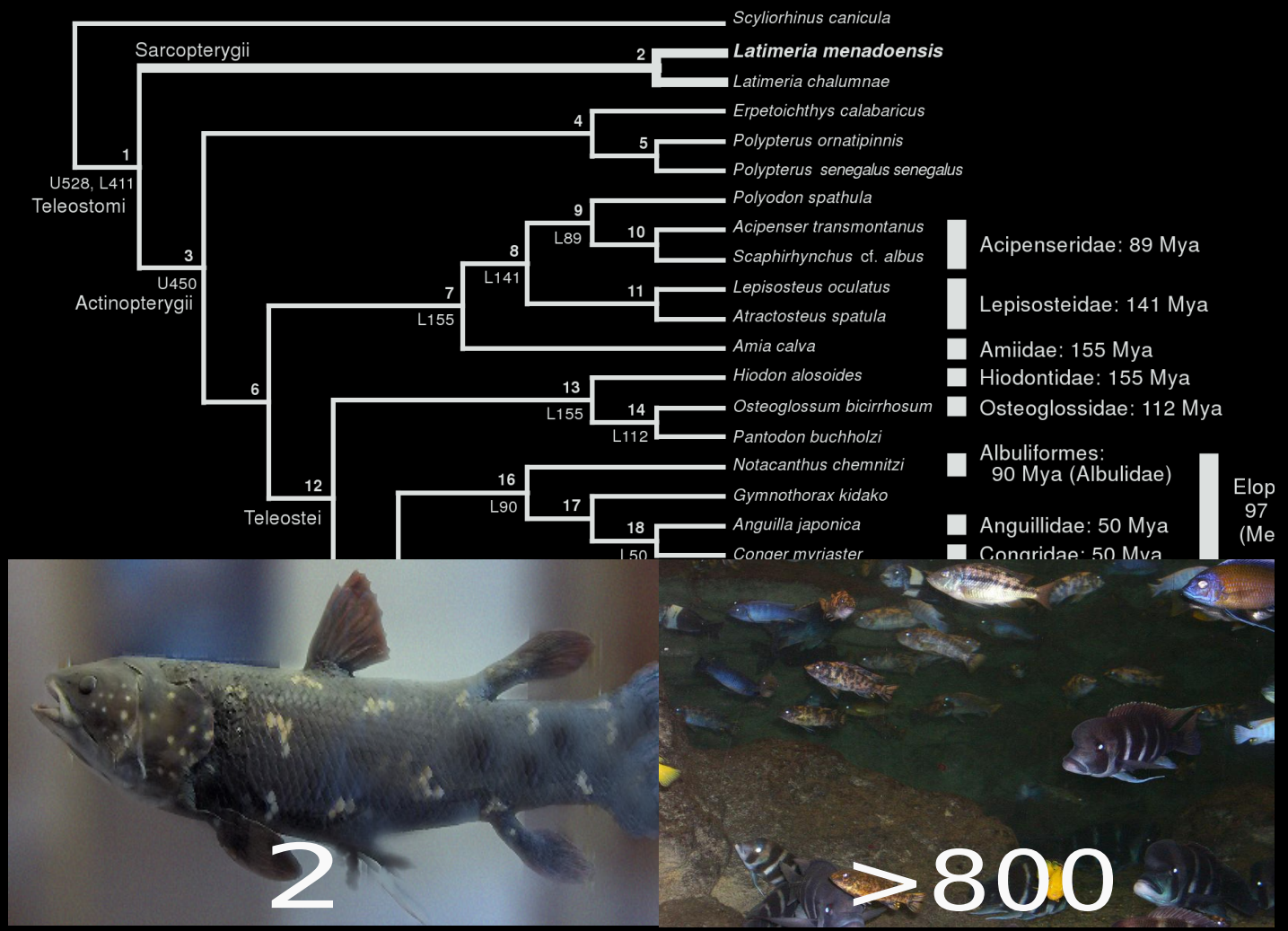
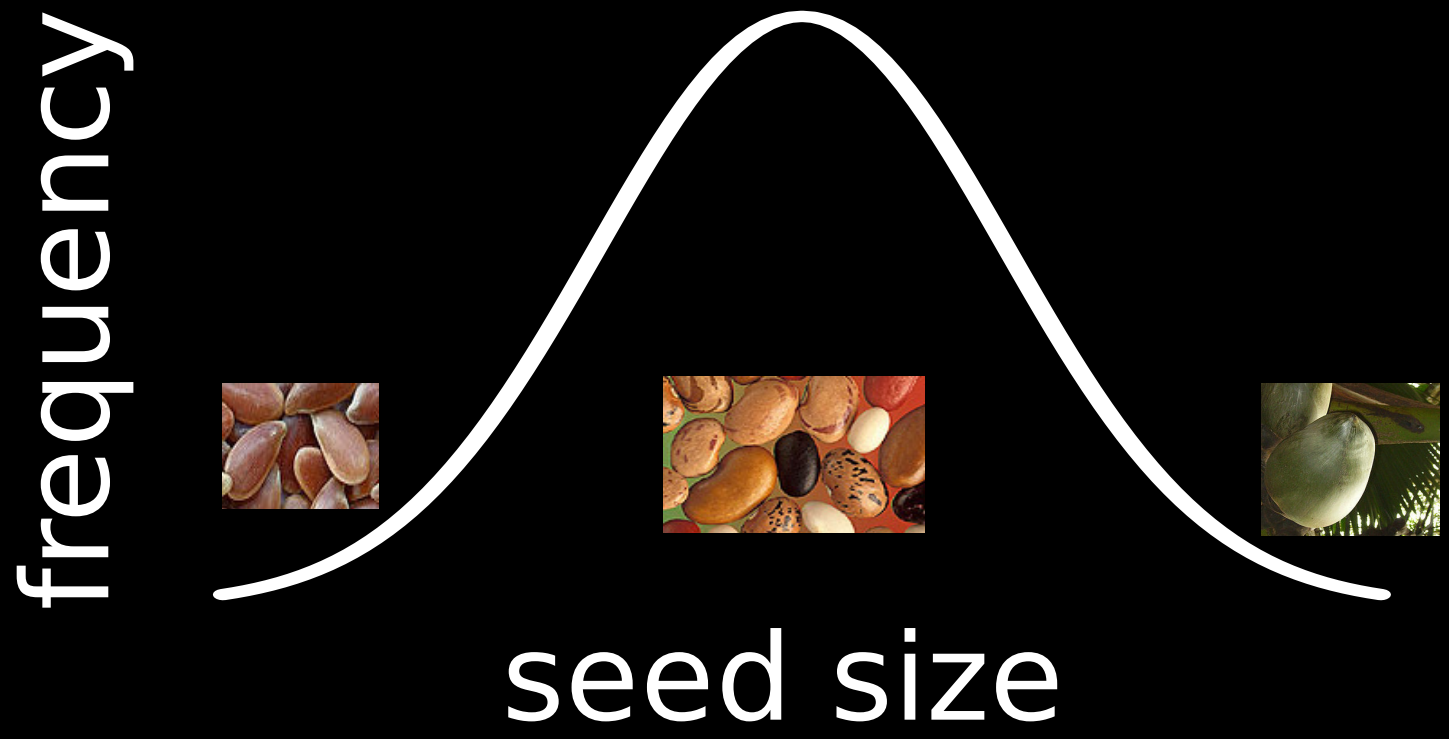
[ speciation ]

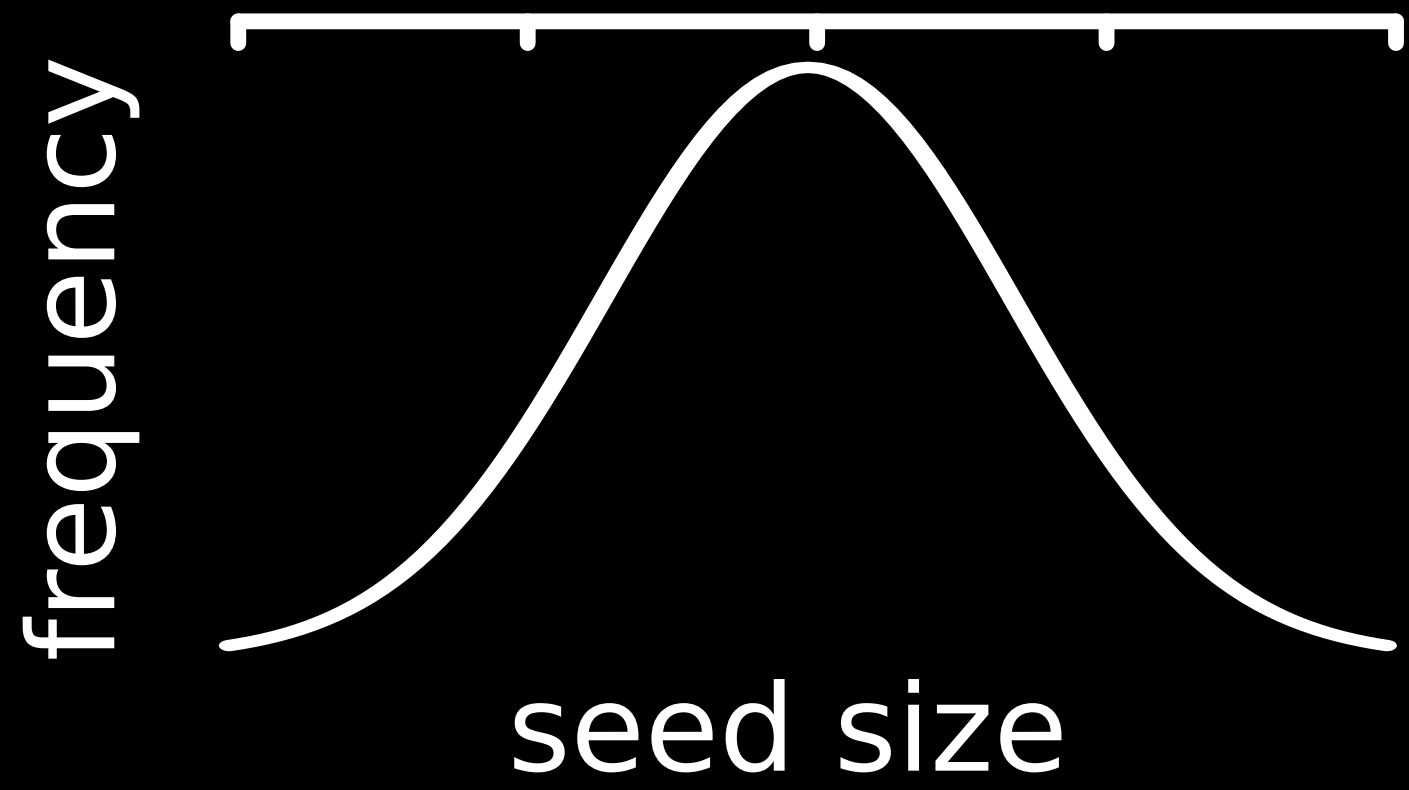
[ biodiversity ]

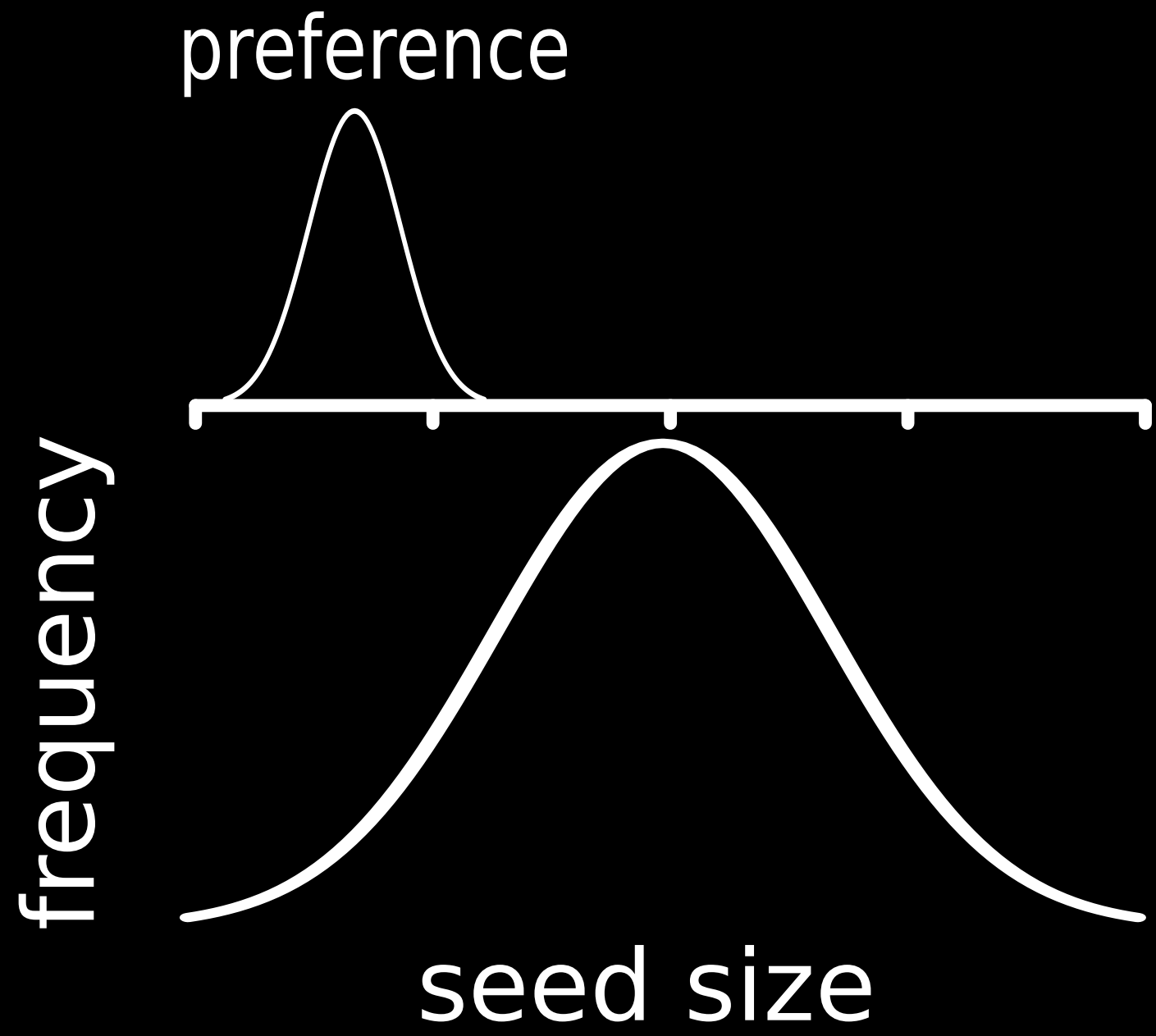
[ insects ]


Scyliorhinus canicula
Sarcopterygii
2
Latimeria menadoensis
Latimeria chalumnae
4
Erpetoichthys calabaricus
5
Polypterus ornatipinnis
Polypterus senegalus senegalus
1
U528, L411
Teleostomi
9
Polyodon spathula
L89
10
Acipenser transmontanus
Scaphirhynchus cf. albus
3
U450
Actinopterygii
8
L141
11
Lepisosteus oculatus
7
L155
Atractosteus spatula
Amia calva
Hiodon alosoides
6
13
L155
14
Osteoglossum bicirrhosum
L112
Pantodon buchholzi
Notacanthus chemnitzi
16
12
Gymnothorax kidako
L90
17
Anguilla japonica
18
Conger myriaster
Teleostei
Acipenseridae: 89 Mya
Lepisosteidae: 141 Mya
Amiidae: 155 Mya
Hiodontidae: 155 Mya
Osteoglossidae: 112 Mya
Albuliformes:
90 Mya (Albulidae)
Anguillidae: 50 Mya
Elop
97
(Me
2
>800

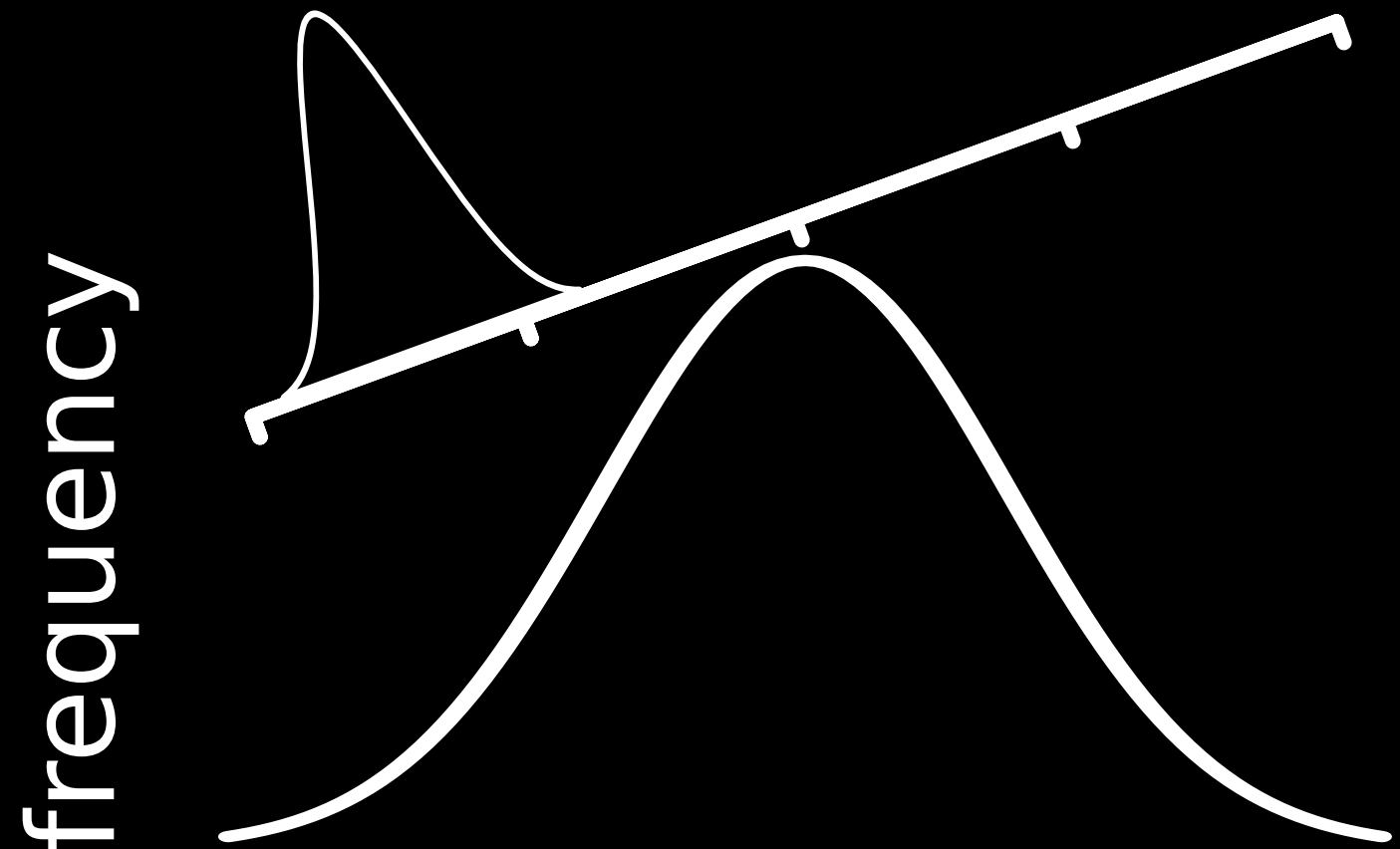
# The Evolutionary Seesaw

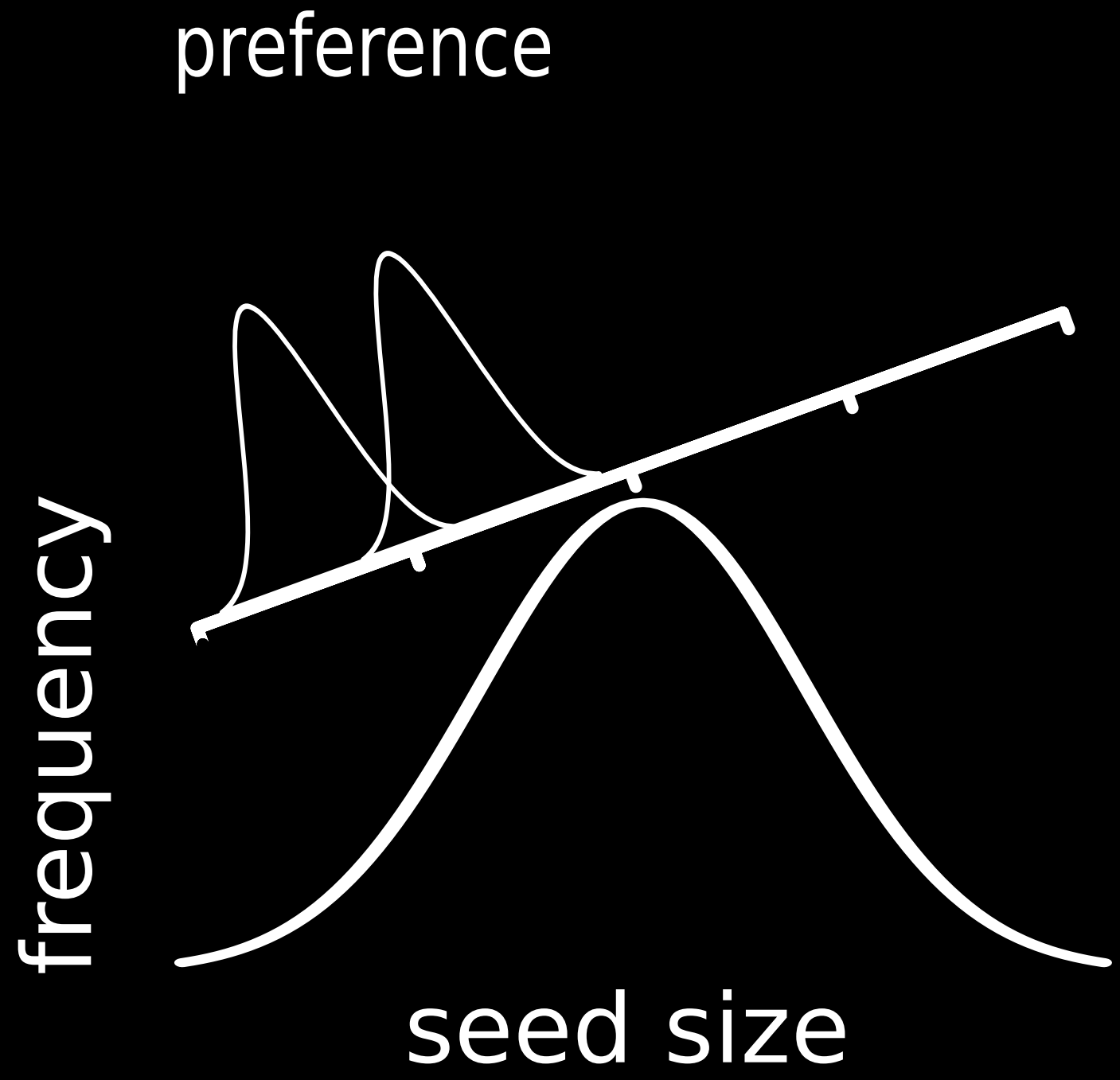

frequency
seed size


frequency
seed size


preference
frequency
seed size

preference




preference
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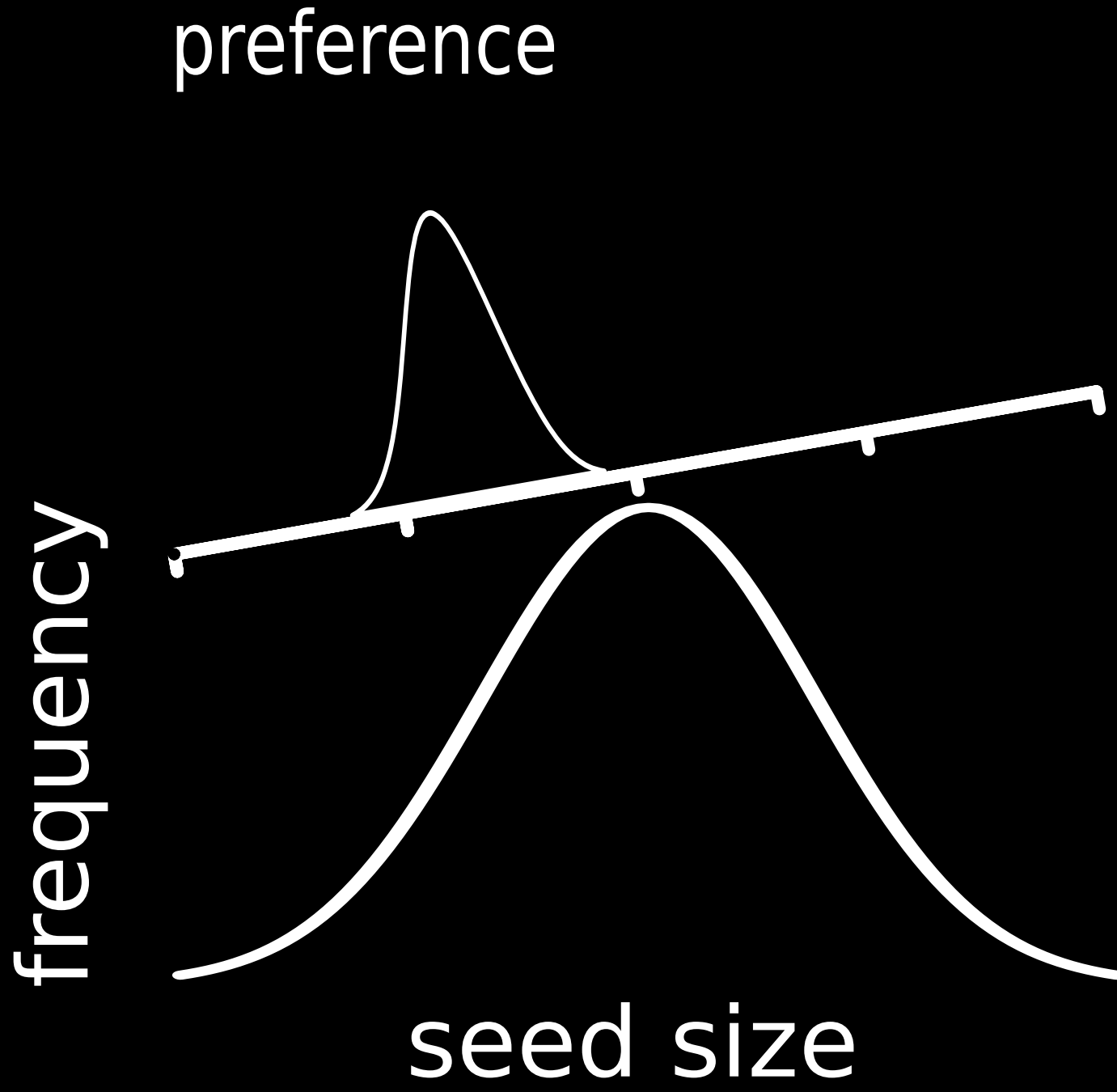
preference
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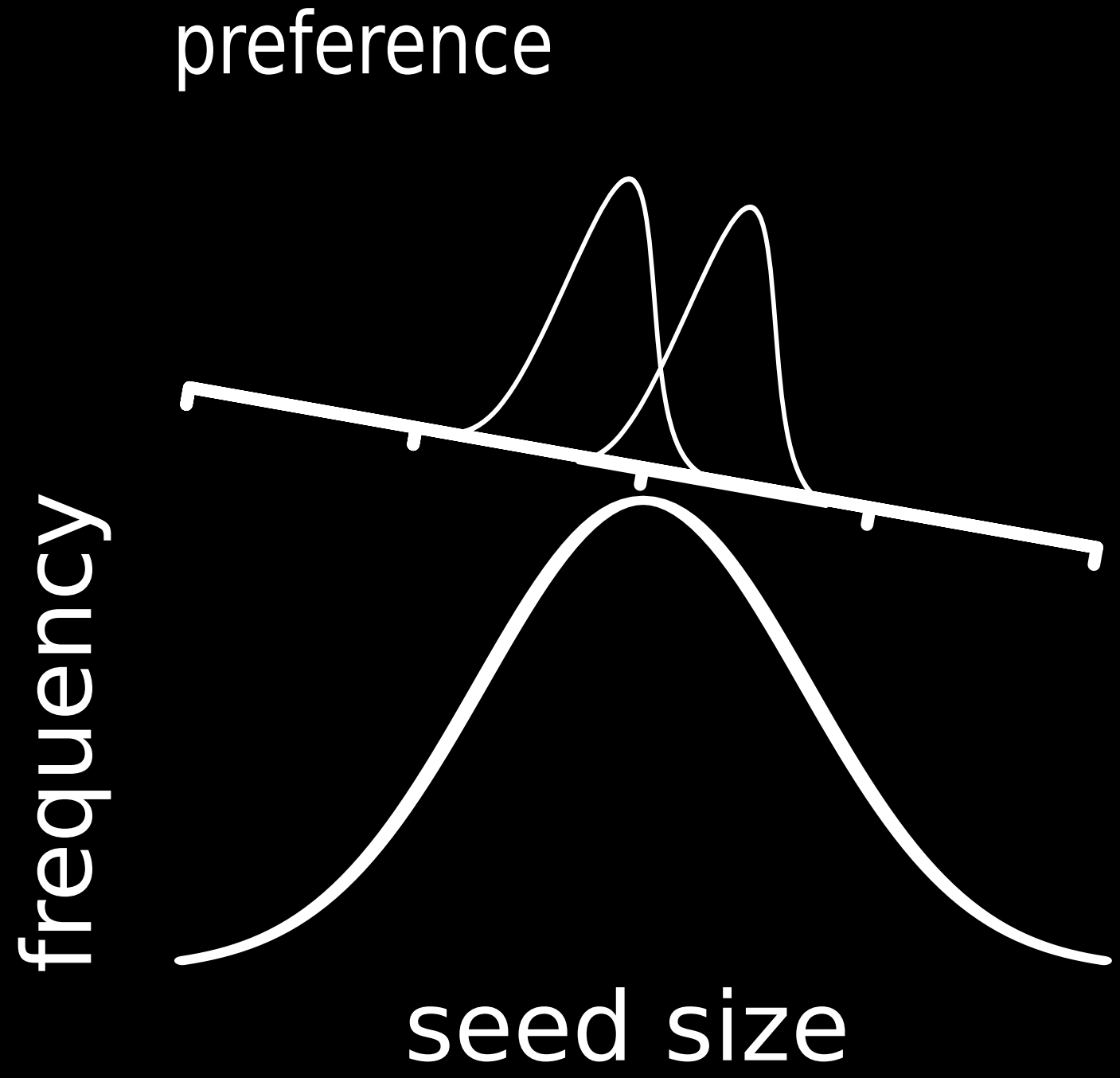
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frequency
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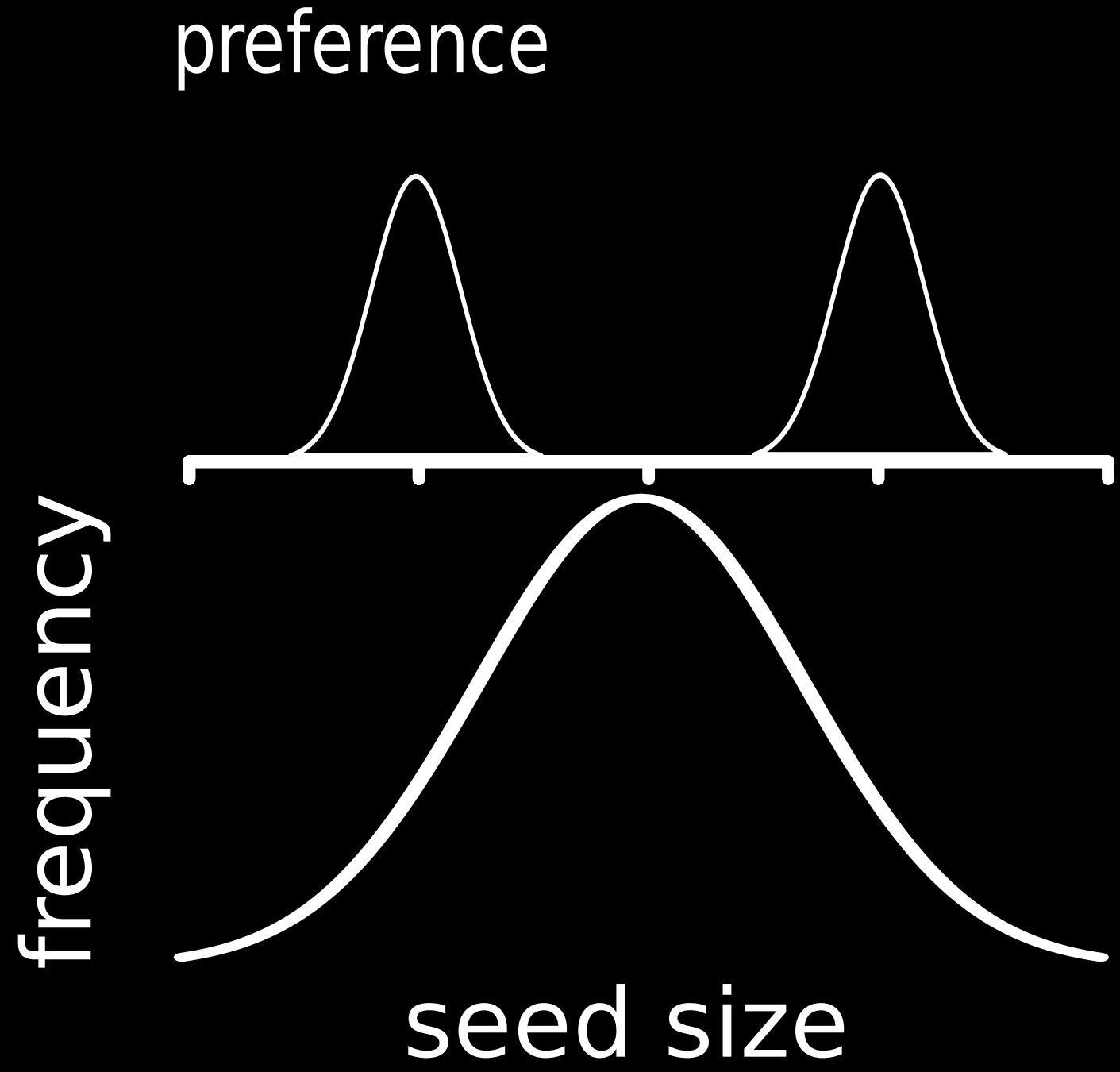
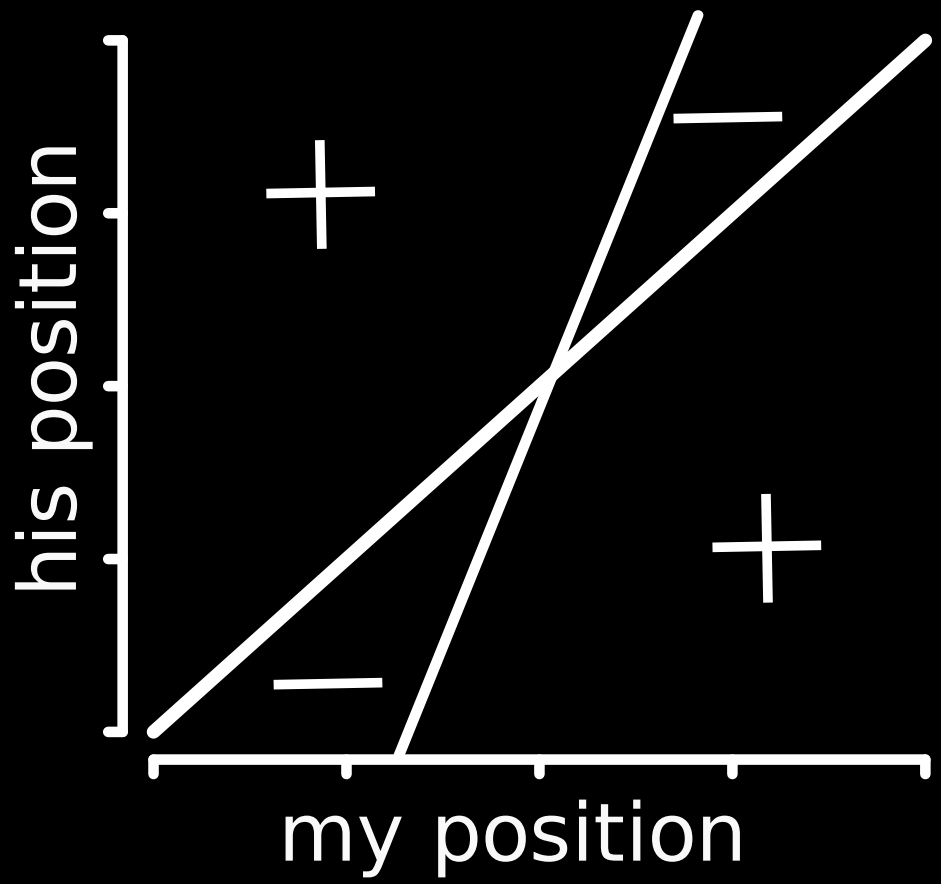
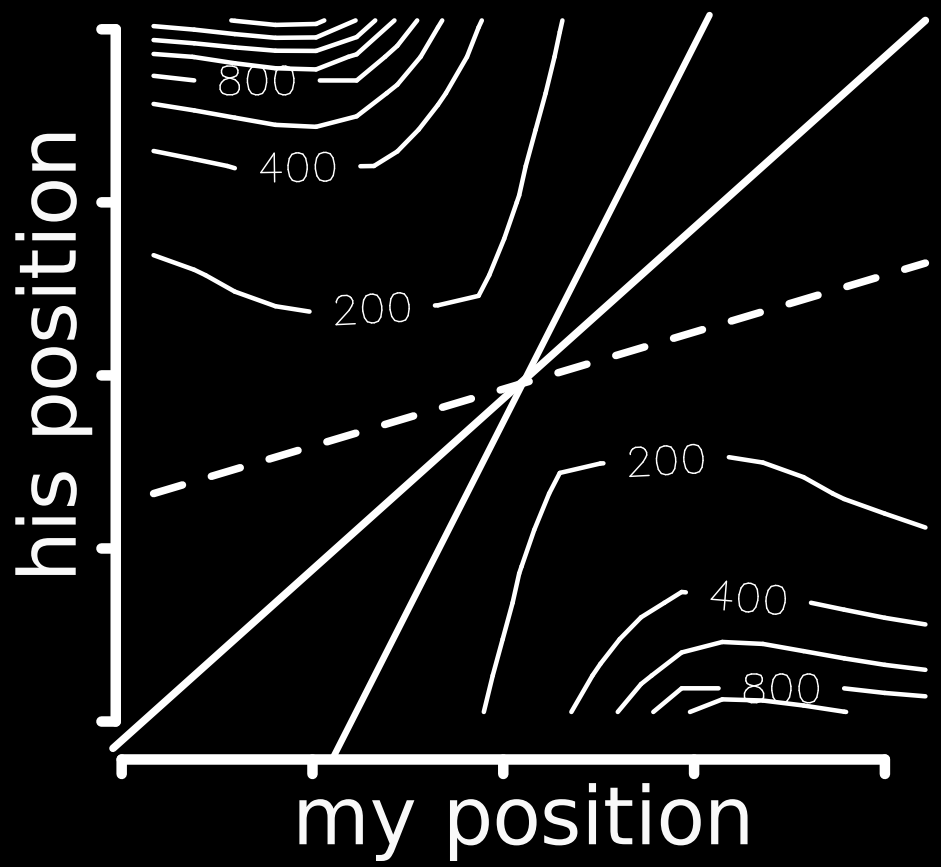

preference
frequency
seed size

# Pairwise Invasibility Plot



# Adding coexistence times



# Puzzles of biodiversity, or, why so many beetles?

Understanding the control nobs of biodiversity

- Population size
- Mutation rate
- Competition strength

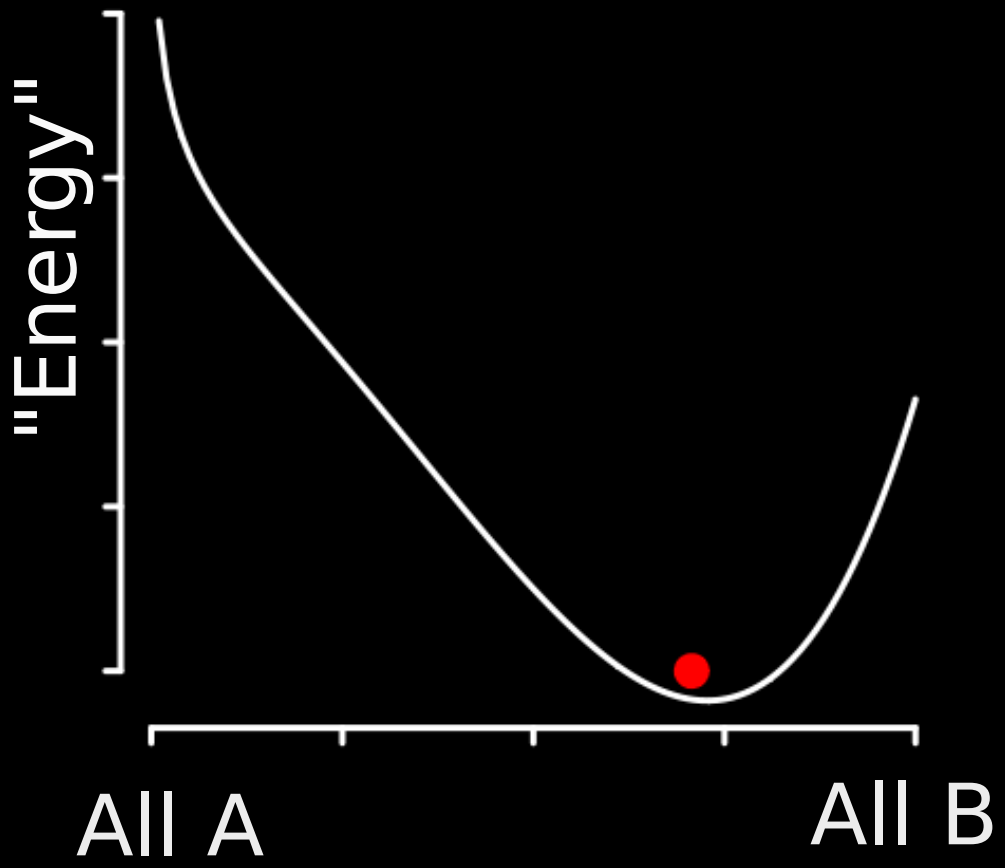
# Thanks!

- Ulf Dieckmann
- Rupert Mazzucco
- EEP Team

- IIASA
- NAS
- UCD
- CSGF, DoE

# Calculating coexistence times

$$T(x) = 2\int_a^x \frac{\mathrm{d}y \int_y^b \frac{\exp\left(\int_a^z \mathrm{d}x\left[\frac{2A(x)}{B(x)}\right]\right)}{B(z)}\mathrm{d}z}{\exp\left(\int_a^y \mathrm{d}x\left[\frac{2A(x)}{B(x)}\right]\right)} \tag{1}$$



# Adding numerical data